REMARKS

<u>GENERALLY</u>

This current Reply is responsive to a current and Non-final Office Action dated 10/26/2006. In this current Office Action, pending claims 1-4, 6-14, and 16-32 were examined, and all pending claims were rejected.

No claims are canceled or added by this Reply. Hence, claims 1-4, 6-14, and 16-32 continue to be presented for examination. Of these pending claims, claims 1, 14, and 23 are independent.

<u>EXAMINER INTERVIEW SUMMARY</u>

Applicant and Applicant's representative would like to thank the Examiner for the courteous Examiner Interview.

On 10/23/2006, an Examiner Interview was conducted between Examiner Amelia L. Rutledge and Applicant's representative, Keith W. Saunders. It was the understanding of Applicant's representative that the arguments regarding Grefenstette et al. were persuasive. Consequently, the finality of the previous Office Action would be rescinded and a new updated search would be conducted followed by the issuance of a subsequent communication. It was believed that any

such subsequent communication would not reject the claims using Grefenstette et al.

<u>OFFICE ACTION REJECTION(S)</u>

Generally, the current Office Action rejected claims 1-4, 6-14, and 16-32 under 35 U.S.C. § 103(a). The current Office Action reads at paragraph #5 and paragraph #6 on page 2 and page 12, respectively:

> 5. Claims 1, 2, 6-14, 19-28, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price et al. (hereinafter "Price"), "Linking By Inking: Trailblazing in a Paper-like Hypertext", HyperText 98, Pittsburgh, PA, copyright ACM 1998, p. 30-39, in view of Farrett, U.S. Patent No. 7,107,261 B2, issued September 2006.

> 6. Claims 3, 4, 16-18, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price in view of Farrett as applied to claims 1, 2, 6-14, 19-28, and 30-32 above, and further in view of Haveliwala et al. (hereinafter "Haveliwala"), "Evaluating Strategies for Similarity Search on the Web", WWW2002, May 2002, p. 432-442.

More specifically, the current Office Action reads (in pertinent parts) as follows:

> While Price does not explicitly teach that collecting the context data comprises deriving at least two search terms, comparing the search terms to a history of search terms, and weighting each of the search terms according to whether a particular search term is included in the history, a higher weight being

assigned to a search term that is included in the history, *Farrett teaches a client side search engine which retains a history record of search terms which is updated and refined, and further assigning a weighted probability category to a keyword that matches the search term keyword* (col. 1, 1. 40-col. 2, 1. 36). *Farrett teaches weighting each search term according to whether a particular search term is included in the history of search terms, a higher weight being assigned to a search term that is included in the history of search terms* (col. 4, 1. 9-col. 5, 1. 5; claim 1). Price discloses that each annotation is interpreted as a text selection and transformed into a list of word weights (p. 34, Col. 2, par. 5-p. 35, Col. 1, par. 2), and Farrett is directed toward weighted keywords, therefore Price and Farrett are analogous art and it would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the client side search engine with history record disclosed by Farrett to the hypertext ink annotation system taught by Farrett, so that the system would have the ability to learn from prior searches for a user relative to a given knowledge base (Farrett, col. 1, 1. 30-36), thereby enhancing the support for reading and browsing in the same medium provided by Price (Price, p. 31, par. 1).

(*italicized* emphasis added by this Reply; excerpted from rejection of Claim 1; first full paragraph on page 3, which extends onto page 4)

While Price does not explicitly teach that the history module includes one or more historical keywords that were previously used, and that the extraction module weights keywords according to whether or not the keywords are included in the history module, *Farrett teaches a client side search engine which retains a history record of search terms which is updated and refined, and further assigning a weighted probability category to a keyword that matches the search term keyword* (col. 1, 1. 40-col. 2, 1. 36). *Farrett teaches weighting each search term according to whether a particular search term is included in the history of search terms, a higher weight being assigned to a search term that is included in the history of search terms* (col. 4, 1. 9-col. 5, 1. 5; claim 1). Price discloses that each annotation is interpreted as a text selection and transformed into a list of word weights (p. 34, Col. 2, par. 5-p. 35, Col. I , par. 2), and Farrett is directed toward weighted keywords, therefore Price and Farrett are analogous

art and it would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the client side search engine with history record disclosed by Farrett to the hypertext ink annotation system taught by Farrett, so that the system would have the ability to learn from prior searches for a user relative to a given knowledge base (Farrett, col. 1, l. 30-36), thereby enhancing the support for reading and browsing in the same medium provided by Price (Price, p. 31, par. 1).

(*italicized* emphasis added by this Reply; excerpted from rejection of Claim 14; second full paragraph on page 7, which extends onto page 8)

Price teaches that annotations that select a phrase result in weighted queries based on the entire surrounding sentence with the emphasis on the selected words (p. 34, Col. 1, par. 2), resulting in a query for a search with words indicated by the annotation and keywords derived from'the context. While Price does not explicitly teach a keyword history list, *Farrett teaches a client side search engine which retains a history record of search terms which is updated and refined, and further assigning a weighted probability category to a keyword that matches the search term keyword* (col. 1, l. 40-col. 2, l. 36). *Farrett teaches weighting each search term according to whether a particular search term is included in the history of search terms, a higher weight being assigned to a search term that is included in the history of search terms* (col. 4, l. 9-col. 5, l. 5; claim 1). Price discloses that each annotation is interpreted as a text selection and transformed into a list of word weights (p. 34, Col. 2, par. 5-p. 35, Col. 1, par. 2), and Farrett is directed toward weighted keywords, therefore Price and Farrett are analogous art and it would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the client side search engine with history record disclosed by Farrett to the hypertext ink annotation system taught by Farrett, so that the system would have the ability to learn from prior searches for a user relative to a given knowledge base (Farrett, col. 1, l. 30-36), thereby enhancing the support for reading and browsing in the same medium provided by Price (Price, p. 31, par. 1).

(*italicized* emphasis added by this Reply; excerpted from rejection of Claim 23; first full paragraph on page 10, which extends onto page 11)

PORTIONS OF FARRETT THAT ARE CITED BY CURRENT OFFICE ACTION

The current Office Action cites to three portions of Farrett:

(1) Column 1, Line 40 to Column 2, Line 36;

(2) Column 4, Line 9 to Column 5, Line 5; and

(3) Claim 1.

(1)   Farrett reads at Column 1, Line 40 to Column 2, Line 36 as follows:

The invention provides a search engine that is client-side, provides high performance and creates user preference relative to a knowledge base. The invention is natural language based. In addition, it is applicable to a variety of knowledge bases and can be adapted to other applications such as on-line help, interactive training, wizard functions, virtual chat sessions, intelligent bots, etc.
A first aspect of the invention is directed to a method of searching for data in a knowledge base having a plurality of categories based on a search keyword, each category having respective keyword data, the method comprising the steps of: determining a match answer category by searching the keyword data for a match to the search keyword; assigning a first weighted probability value to each category having a keyword that matches the search keyword; assigning a second weighted probability value to each category having a shared keyword, other than the search keyword, in respective keyword data to that of the match answer category; assigning a third weighted probability value to each category related to the match answer category in a relation table; updating cumulative probability values of a history record with the assigned weighted probability values; and determining an alternative answer category based on a highest cumulative probability value for the match answer category.
A second aspect of the invention is directed to a search engine system for searching a knowledge base having a plurality of categories based on a search keyword, the search engine system comprising: a match module that determines a match answer category based on a search keyword; an alternative answer module including: a probability value assigner that: assigns a first weighted probability value to each category having a keyword that matches the search keyword; assigns a second weighted probability value to each category having a

shared keyword, other than the search keyword, in respective keyword data to that of the match answer category; assigns a third weighted probability value to each category related to the match answer category in a relation table; an updater that updates a history record of cumulative probability values created over time based on the assigned weighted probability values; and an answer determinator that determines an alternative answer category based on a highest cumulative weighted probability value for the match answer category.

A third aspect of the invention is directed to a computer program product comprising a computer useable medium having computer readable program code embodied therein for searching a knowledge base based on a search keyword, the program product comprising: program code configured to determine a match answer category by searching the keyword data for a match to the search keyword; program code configured to assign a first weighted probability value to each category having a keyword that matches the search keyword; program code configured to assign a second weighted probability value to each category having a shared keyword, other than the search keyword, in respective keyword data to that of the match answer category; program code configured to assign a third weighted probability value to each category related to the match answer category in a relation table; program code configured to update cumulative probability values of a history record with the assigned weighted probability values; and program code configured to determine an alternative answer category based on a highest cumulative probability value for the match answer category.

(2)   Farrett reads at Column 4, Line 9 to Column 5, Line 5 as follows:

In step S4, each matched category found is assigned a first weighted probability value (WPV) by probability value assigner 34 of alternative answer module 28. For description purposes, the first weighted probability value may be 0.3. It should be recognized, however, that the first weighted probability value (and other weighted probability values described below) can be altered to accommodate user preferences.

In step S5, a determination is made by answer determinator 36 of alternative answer module 28 as to whether the match answer category has a shared keyword, i.e., a keyword other than the search keyword, with other category(ies). If so, each category that shares a keyword(s) with the match answer category is assigned a second weighted probability value by probability value assigner 34 in step S6. The second weighted probability value may be, for example, 0.2.

In step S7 (FIG. 5), a determination is made by answer determinator 36 as to whether the match answer category is related to another category by other than a keyword. In this case, relation table 60 (FIG. 3) is referenced to see if a relation exists. If a relation does exist, a third weighted probability value is assigned to the category by probability value assigner 34 in step S8. The third weighted probability value may be, for example, 0.1. Hence, the progression from first, to second, to third weighted probability value is a diminishing progression to symbolize the lower likelihood that someone looking for the match answer category is also interested in the other categories with weighted probability values assigned.

Referring to FIG. 6, the above-described weighted probability values can be saved in, for example, a table, which may be referred to as a probability

matrix table (PMT) 64. Where more than one value may be assigned to a category relationship, the highest weighted probability value is given.

In step S9, an initial history record 66 (FIG. 7) is updated with the probability values from PMT 64 by updater 38. A "history record" is a record such as a table that compares each category with each other category based on cumulative probability values created over time. When the history record is updated, PMT 64 probability values are accumulated in corresponding cells of initial history record 66 to create an updated history record 68 (FIG. 8). Accumulation may be conducted in any now known or later developed process. In one embodiment, accumulation will be had by simple addition. Saving of the history record after updating may also be completed as part of step S9.

In step S10, an alternative answer category is determined based on a highest cumulative probability value for the match answer category in the updated history record. For example, if the match answer category is category 1, the highest cumulative probability value is 0.6 for category 12. Hence, category 12 is the alternative answer category. In the case, that the match answer category does not include any cumulative probability values, i.e., a 0 is recorded, the alternative answer is made to indicate that no alternative answer is known.

In step S11, the match answer category and alternative answer category are reported by reporter 30 (FIG. 1). As shown in FIG. 9, an interface 70 including an input area 72 and an output area 74 for reporting the answer categories may be provided in a natural language format that is interactive.

As a final step, step S12, the above processes may be repeated with another search.

(3)   Farrett reads at Claim 1 as follows:

1. A method of searching for data in a knowledge base having a plurality of categories based on a search keyword, each category having respective keyword data, the method comprising the steps of: determining a match answer category by searching the keyword data for a match to the search keyword; assigning a first weighted probability value to each category having a keyword that matches the search keyword; assigning a second weighted probability value to each category having a shared keyword, other than the search keyword, in respective keyword data to that of the match answer category; assigning a third weighted probability value to each category related to the match answer category in a relation table, wherein the third weighted probability value is determined independent from the search keyword and the shared keyword; updating cumulative probability values of a history record with the assigned weighted probability values; determining an alternative answer category based on a highest cumulative probability value for the match answer category; reporting the match answer category and the alternative answer category; and saving the history record after updating.

I.   Farrett does not teach weighting words in any manner.

It is respectfully submitted that Farrett does not teach weighting words in any manner. Instead, Farrett appears to teach "assigning a first weighted probability value to each *category* having a keyword that matches the search keyword" (*italicized* emphasis added by this Reply; Farrett; excerpted from the cited Claim 1). Farret also appears to teach "assigning a second weighted probability value to each *category*..." and "assigning a third weighted probability value to each *category* related to the match answer category in a relation table..." (*italicized* emphasis added by this Reply; Farrett; both excerpted from the cited Claim 1).

It is therefore respectfully submitted that Farrett teaches assigning weighted probabilities to *categories*.

In contrast, the independent claims recite the following:

Claim 1:   weighting each of the search terms according to whether a
           particular search term is included in the history of search terms ...

Claim 14: wherein the extraction module is further configured to weight
           keywords according to whether or not the keywords are included in
           the history module.

Claim 23: … by weighting at least a portion of the search terms based on a keyword history list that includes previously-used keywords that were used in at least one query in one or more previous searches.

II.   Farrett does not teach having a history of search terms.

It is respectfully submitted that Farrett does not teach creating, maintaining, utilizing, etc. a history of search terms. Instead, Farret appears to teach "Referring to FIG. 6, the above-described weighted probability values can be saved in, for example, a table, which may be referred to as a probability matrix table (PMT) 64. Where more than one value may be assigned to a *category relationship*, the highest weighted probability value is given. [New Paragraph Begins] In step S9, an initial history record 66 (FIG. 7) is updated with the probability values from PMT 64 by updater 38. A "history record" is a record such as a table that *compares each category with each other category based on cumulative probability values created over time*. […]" (*italicized* emphasis added by this Reply; Farrett; excerpted from Column 4, Lines 38-47).

It is therefore respectfully submitted that Farrett teaches having a history record that is directed to *category relationships*.

In contrast, the independent claims recite the following:

Claim 1:   weighting each of the search terms according to whether a particular search term is included in the history of search terms …

Claim 14: a history module that includes one or more historical keywords that were previously used in the system in at least one query for one or more searches.

Claim 23: ... by weighting at least a portion of the search terms based on a keyword history list that includes previously-used keywords that were used in at least one query in one or more previous searches.

Consequently, it is respectfully submitted that Farrett., alone or in combination with any art of record (including Price et al.), does not render the claimed invention obvious because (I) <u>Farrett does not teach weighting words in any manner</u> and/or (II) <u>Farrett does not teach having a history of search terms</u>.

Thus, no art of record, either alone or in any combination, anticipates or renders obvious at least the following elements in conjunction with the other elements of their respective claims:

Claim 1: comparing the search terms to a history of search terms . . . weighting each of the search terms according to whether a particular search term is included in the history of search terms, a higher weight being assigned to a search term that is included in the history of search terms.

Claim 14: a history module that includes one or more historical keywords that were previously used in the system in at least one query for one or more searches . . . wherein the extraction module is further

configured to weight keywords according to whether or not the keywords are included in the history module.

Claim 23: locating additional content that may be of interest to the user by executing a search with one or more words indicated by the annotation and one or more keywords derived from the context data and from a keyword history list that includes previously-used keywords that were used in at least one query in one or more previous searches.

For the reasons provided above, it is respectfully submitted that independent claims 1, 14, and 23 are allowable. Moreover, although each of the pending dependent claims also includes additional element(s) militating toward allowability, they are allowable at least for the reasons given above in connection with their respective independent claims.

Accordingly, withdrawal of the § 103(a) rejections is hereby respectfully requested.

CONCLUSION

It is respectfully submitted that all of pending claims 1-4, 6-14, and 16-32 are allowable. Consequently, allowance of claims 1-4, 6-14, and 16-32 is hereby respectfully requested.

If the next communication from the Office is not to include an indication of allowable subject matter, the undersigned representative of the Applicant respectfully requests a telephonic interview with the Examiner.

Respectfully Submitted,

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